

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/JP2004/009841

Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on translations from the original language into the following language _____, which is the language of a translation furnished for the purposes of:

- ☐ international search (under Rules 12.3 and 23.1(b))
☐ publication of the international application (under Rule 12.4)
☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*.

☐ the international application as originally filed/furnished
☒ the description:
pages 1-5, 8-33 as originally filed/furnished
pages* 6, 7, 7/1 received by this Authority on 28.04.2005
pages* _____ received by this Authority on _____

☒ the claims:
Nos. 1-6 as originally filed/furnished
Nos.* _____ as amended (together with any statement) under Article 19
Nos.* 7, 8, 11-13 received by this Authority on 28.04.2005
Nos.* _____ received by this Authority on _____

☒ the drawings:
~~sheets~~/figs 1-12 as originally filed/furnished
sheets/figs* _____ received by this Authority on _____
sheets/figs* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3. ☒ The amendments have resulted in the cancellation of:

☐ the description, pages _____
☒ the claims, Nos. 9, 10
☐ the drawings, sheets/figs _____
☐ the sequence listing (*specify*): _____
☐ any table(s) related to sequence listing (*specify*): _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages _____
☐ the claims, Nos. _____
☐ the drawings, sheets/figs _____
☐ the sequence listing (*specify*): _____
☐ any table(s) related to sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded".

AMENDMENT UNDER PCT ARTICLE 34

In the claims

Please replace page 70 with the substitute amendment sheets of pages 70 and 70/1.

Claims 7 and 8 are amended so as to replace the wording "60 to 150°C" recited therein with "60 to 100°C", respectively. Claims 9 and 10 are deleted. Moreover, New claims 11-13 are added.

In the description

Please replace pages 13 and 14 with the substitute amendment sheets of pages 13, 14 and 14/1 so as to accord with the amendments of the claims.

(7) A method for producing functional starch powder according to any one of (1) to (3), which includes heating a starch raw material in the presence of water at 60 to 100°C to swell starch particles of the starch raw material and subsequently drying the swollen starch particles to obtain a powder mixture comprising starch particles and amylose and amylopectin which are present in the exteriors of these starch particles.

(8) A method for producing functional starch powder according to any one of (1) to (3), which includes heating a starch raw material in the presence of water at 60 to 100°C to swell some or all of starch particles of the starch raw material at a volume ratio of 10 or more and subsequently drying the swollen starch particles to obtain a powder mixture comprising starch particles having a structure indented in one or more parts and amylose and amylopectin which are present in the exteriors of these starch particles.

(9) A method for producing functional starch powder according to any one of (1) to (3), which includes heat-treating a starch raw material at 100 to 130°C under reduced pressure and subsequently heating the starch raw material in the presence of water at 60 to 150°C to swell starch particles of the starch raw material and drying the swollen starch particles to obtain a powder mixture comprising starch particles and amylose and amylopectin which are present in the exteriors of these starch particles.

(10) A method for producing functional starch powder according to any one of (1) to (3), which includes a step of heat-treating a starch raw material at 100 to 130°C under reduced pressure and then heating
5 the starch raw material in the presence of water at 60 to 150°C to swell some or all of starch particles of the starch raw material at a volume ratio of 10 or more and subsequently drying the swollen starch particles to obtain a powder mixture comprising starch particles
10 having a structure indented in one or more parts and amylose and amylopectin which are present in the exteriors of these starch particles.

(11) A method according to any one of (7) to (10), wherein the starch raw material is potato starch.

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Advantages of the Invention

The present invention is novel starch powder which has satisfactory release-sustaining properties owing to its high α -amylase resistance not possessed by
20 conventional natural or processed starch, is excellent in pH stability and long-term stability and, moreover, is not affected by ionic strength, so that it is free from the dose dumping problem in conventional release-sustaining base ingredients and hence permits accurate
25 control of an active ingredient(s).

BRIEF DESCRIPTION OF THE DRAWINGS

[Fig. 1] An electron micrograph (600 magnifications)

of starch powder B prepared in Example 2.

[Fig. 2] An electron micrograph (600 magnifications)
of starch powder F prepared in Example 6.

[Fig. 3] An electron micrograph (100 magnifications)
5 of the commercial potato pregelatinized starch used in
Comparative Example 1.

[Fig. 4] An electron micrograph (200 magnifications)
of the commercial corn pregelatinized starch used in
Comparative Example 2.

[7] (Amended) A method for producing functional starch powder according to any one of claims 1 to 3, which comprises heating a starch raw material in the presence of water at 60 to 100°C to swell starch particles of the starch raw material, and subsequently drying the swollen starch particles to obtain a powder mixture comprising starch particles and amylose and amylopectin which are present in the exteriors of these starch particles.

[8] (Amended) A method for producing functional starch powder according to any one of claims 1 to 3, which comprises heating a starch raw material in the presence of water at 60 to 100°C to swell some or all of starch particles of the starch raw material at a volume ratio of 10 or more, and subsequently drying the swollen starch particles to obtain a powder mixture comprising starch particles having a structure indented in one or more parts thereof and amylose and amylopectin which are present in the exteriors of these starch particles.

[9] (Deleted)

[10] (Deleted)

[11] (New) A method for producing functional starch powder according to any one of claims 1 to 3, which comprises heat-treating a starch raw material at 100 to 130°C under reduced pressure, heating the starch raw material in the presence of water at 60 to 150°C to swell starch particles of the starch raw

material, and subsequently drying the swollen starch particles to obtain a powder mixture comprising starch particles and amylose and amylopectin which are present in the exteriors of these starch particles.

[12] (New) A method for producing functional starch powder according to any one of claims 1 to 3, which comprises heat-treating a starch raw material at 100 to 130°C under reduced pressure, heating the starch raw material in the presence of water at 60 to 150°C to swell some or all of starch particles of the starch raw material at a volume ratio of 10 or more, subsequently drying the swollen starch particles to obtain a powder mixture comprising starch particles having a structure indented in one or more parts thereof and amylose and amylopectin which are present in the exteriors of these starch particles.

[13] (New) A method according to claim 7, 8, 11 or 12, wherein the starch raw material is potato starch.

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